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Forest Fires—Another Lesson from India.

THE unusual drought which prevails throughout the eastern United States has made the forests more liable to fire than usual at this season, and as we write there are destructive conflagrations in the woods of southern New Jersey, western Pennsylvania, Long Island, the Adirondacks and all of the New England states. It is the same sickening story of standing timber, saplings and seedlings vanishing together in smoke, while the soil is burned to absolute sterility, or, at least, is left in a less productive condition for new forest growth. In many cases, too, fences, orchards, fruit gardens and farm-buildings have been swept away, so that the whole thing means dead loss for the present, and loss of hope for the future, without any palliation or compensating advantage. Next spring, if the weather is dry when farmers who live on the forest border begin to start their brush fires, the woods will burn again, and careless campers, locomotive sparks and the reckless tramp who owns a match will all aid in the work of destruction. This will be repeated the spring following, and so on, but it is evident that an end must come to this wanton destruction at some time in the future. Intelligent people in various parts of the country are coming to understand that the loss of the forests is not simply a loss to their owner, but a loss to the community. The legislatures of different states are enacting laws which, if properly enforced, would protect the woods. States like Maine and Minnesota have taken the lead in this legislation, and if the laws would enact themselves there would be few more forest fires. But, as we have repeated over and over again, what is primarily needed is an educated public opinion. As soon as it is generally understood by the people who live near the forest that it is as truly to their personal interest to stop a fire in the woods as it is to stop a fire in their own buildings there would be good laws, and these laws would be enforced.

This we have asserted often, because the statement is based on reasonable grounds, but we never realized to the full that it had been demonstrated on a large scale until we carefully read the paper by Mr. Ribbentrop, to which allusion was lately made on page 191. Under the sway of the Mohammedans in India, the wandering tribes fired the forests year after year to provide grazing grounds for their growing herds of cattle. Under the British rule the herds multiplied and new areas were cleaned by fire. The woods were everywhere looked upon, as they were in the early history of this country, as barriers against progress, obstructions which must be swept away to make room for profitable agriculture. At last it began to be felt in India, as we are beginning to feel here, that wood is worth something. The Government began to realize that large portions of the forest area in the Indian Empire would be burned unless special measures were adopted for their protection. Fifteen thousand square miles were set apart for special patrol and protection in 1883. Twice that area is now protected, and the rest of the forest which is not under this special care has secured much greater immunity from fire. The protected areas include not only the evergreen woods, and those which in marshy regions are self-protected, but large areas of dry forests which were formerly subjected to yearly or, at least, to oft-recurring conflagrations. Besides this, fire is kept out of the comparatively unprotected woods, and this is largely due, according to Mr. Ribbentrop, to the spread of knowledge among the agricultural population. Their growing interest in the protection of the woods has led to a careful use of fire in their vicinity.

The Indian Forest Department has thus proved clearly that it is possible to protect large forest areas from fire even in the very driest climate by a well-considered system of patrol, and their experience has also proved that the example set by Government has caused the agricultural population to pay a greater respect to forest covering. Of course, in this country, where labor is comparatively scarce and dear, a system of forest guards will be more expensive, but, on the other hand, the education of the people is much higher than it is among Indian peasants, and, as Mr. Ribbentrop well says, "the feeling of the people in respect to a conservative forest policy has more to do with successful fire protection than any number of fire-breaks and watchers." No doubt, the way to begin to protect forests is to pay for their protection. No scheme for voluntary help is trustworthy. Strict laws are necessary and the enforcement of them requires men and money, but this will be the cheapest process in the long run, for the people will soon learn to be careful how to use fire in the dangerous neighborhood of forests, and they will soon be helpful in enforcing the laws rather than harmful in opposing them.

SINCE the above was written we have received a circular issued by the Forestry Division of the Department of Agriculture, which discusses the question whether protection against forest fires is practicable, and the answer is that although these fires cannot be altogether prevented by any system, there is abundant experience on this continent to prove that it is practicable and simple to protect large forest areas against fire, and that it is practicable to burn the débris of the lumbermen's chopping, and to do both cheaply. In support of the first proposition the report of the Commissioner of the Crown Lands of the Province of Ontario for 1895 is quoted. Here a system of fire-ranging is established under which a number of men are enlisted from May to September wherever there is special danger. The men who own licenses to cut the lumber, and who are, therefore, interested and who are familiar with the topography, are allowed to nominate the men employed, the Department reserving the right to reject or remove any one who neglects his duties. These rangers put up posters containing the fire act throughout the territory under their charge and hand the laws in pamphlet to settlers, so that everybody becomes familiar with their provisions. They are authorized to employ assistance when the fires break out, and when these assume dangerous proportions they are required to notify the Department and the licensee, so that both may be represented. The Department bears half of the expense, and at the end of the season, diaries, with sworn accounts and reports on the fire losses, etc., are sent

in. Last summer was an exceptionally dangerous one, being the driest for years, and yet owing to this close supervision no large destruction of timber took place, and altogether the service has proved admirably adapted to accomplish the end for which it was established.

On the second point a large firm of lumbermen in Michigan testify that they always burn the débris from their operations in the fall or spring when the ground is damp, and the wind is in the right direction, so that the fires will not spread. This has proved perfectly successful, and for years they have not suffered from any destructive forest fires. The open chopping dries out more quickly in the spring than the neighboring timbered land, consequently the fire burns in the open and stops as soon as it comes to the woods. Only common sense and ordinary judgment are required to point out the proper time to burn the choppings and thus remove a menace to uncut timber. These lumbermen consider this burning over a good insurance, and the cost is so trifling that it would be criminal carelessness on their part if they did not guard against losses to themselves and to their neighbors.

The cost of the protective service in Ontario was about three and a quarter cents a thousand feet, while the cost of burning the débris by the lumber companies was $5.00 a square mile, or one-tenth of a cent a thousand feet of lumber cut. At this rate the cost of burning throughout the great lumbering states of Michigan, Wisconsin and Minnesota would be less than $35,000 a year, and this would prevent losses which foot up to millions of dollars annually. If to this precaution a service similar to the one in Ontario were carried out at the same expense it would appear that for $100,000 a year each of these states could have a well-organized service of special guards which would prevent nearly all the forest fires. To get some conception of what is really lost in these fires, and to show how insignificant in comparison to this the expenditure of any ordinary sum for protection would be, the following computation by the Forest Commissioner of Pennsylvania is quoted:

The most obvious consequences of forest fires, serious as these may be, are by no means of the greatest importance. Loss of logs, of bark, of standing timber, young and old, of fences, and occasionally of buildings, is not less than a million of dollars annually to this commonwealth (Pennsylvania). The indirect or the consequential damage to the state is many times greater. In fact, it is so great that it appears incredible until a careful study of the whole subject is made. For example, it is fairly within bounds to assert that if all the unproductive land now vacant and uncared for within the limits of the state were protected from forest fires for, say, forty years, the timber then growing would be worth not less than $1,200,000,000. Now, it would seem that if this growth were destroyed by fire when but a year old, the direct loss to the commonwealth would be absolutely unimportant. The same might be said if we were to see it destroyed at two, three, four, or even five years of age. But when we remember that in burning these seedlings which are but a year old we destroy a crop which, in point of time, is one-fortieth of its way on to a money value of $1,200,000,000, the damages, if expressed in figures, must equal not less than $30,000,000 as the loss to the commonwealth.

Shrubs, Native and Foreign.

CONTINUING our remarks on the effects of the winter on trees and shrubs in eastern Massachusetts made in our last issue, it can be said generally that the flower-buds only of shrubs which bloom early in the season have suffered, and that, in spite of the severity of the winter, nearly all later-blooming plants are flowering profusely this season, with the exception, perhaps, of a few varieties of Rhododendrons of doubtful hardiness, which have lost their flower-buds, although their foliage is untouched. Even shrubs which ordinarily suffer in very cold winters are now covered with flowers, like the Halesia or Silver Bell Tree, which has never been more beautiful than it is this year. The variety of this plant raised by Mr. Meehan in his nursery at Germantown, and already figured in this journal (vol. v., p. 535), is covered with flowers and promises to become a first-rate addition to our shrubberies. The fact that Fothergilla Gardneri, which was figured in this journal last year (vol viii, p. 445), has escaped the winter untouched, and has been loaded with its lovely white flowers, is evidence of the value of this southern shrub for northern gardens. Among shrubs which flower the middle of May, none surpasses it in shapeliness of habit or in profusion of bloom. It is one of those shrubs which grow in attractiveness each year, and which, as has already been said more than once in these columns, should be seen in all collections of hardy plants.

Rhododendron Vaseyi (vol. i., p. 377) has been covered as usual with its lovely pure pink flowers, and the value of this species in northern gardens appears now to be fully established, although in England it is said to be much less satisfactory than it is here.

All the bush Honeysuckles are flowering profusely, displaying in their flowers a considerable range of colors from deep rose to white and to clear yellow. On the whole, this is one of the most satisfactory groups of shrubs. They are all perfectly hardy, of excellent habit and neat, clean foliage; they always bloom freely, and their flowers are followed by brilliant scarlet, yellow or black fruits which cover the branches in early or late summer, when few other plants bear conspicuous fruits. Through cross-breeding and selection there is now a large number of these Honeysuckles from which the planter can select, and by massing many plants with a reference to the color of their flowers or of their fruit remarkable effects can be produced.

Among Apple-trees, our native Crab, Pyrus coronaria, is the latest to bloom. This is a small tree of excellent habit and large fragrant pink flowers which, as they do not appear until after the leaves have partly grown, are somewhat hidden by the young foliage. They are, however, more fragrant than those of any other Apple-tree, and the bright waxy fruit, which hangs gracefully on long slender stems, is also fragrant.

All the Thorn-trees, native and foreign, are blooming abundantly this year, and no one who has not seen a well-established collection of these trees and shrubs can form an idea of their beauty at this season or of the uses to which they can be put in the decoration of parks and large gardens. The fact that they live to a great age, blooming profusely every year, adds to their value.

Among Barberries for northern gardens not one compares with the Japanese Berberis Sieboldii (vol. iii., p. 249). The bright yellow flowers of this shrub contrast brilliantly with the large lustrous foliage, and this late in the autumn assumes magnificent tints of scarlet and orange. For some reason this shrub has remained rare in collections, while the less desirable Berberis Thunbergii has become in the neighborhood of Boston one of the commonest garden plants.

The Dauphin Elm.

THE White Elm as a street-tree is conspicuously rare throughout central Pennsylvania, and at present is probably less planted than any other native tree. Fine specimens may be found in the older streets of cities and about old country seats, yet there are many otherwise intelligent people who believe that the Elm does not thrive in Pennsylvania or, indeed, south of New England.

Some two years ago Dr. Rothrock pointed out the fallacy of this idea, which, no doubt, was developed from the fact that the tall high-branching Elm, so associated in the popular mind with New England towns and scenery, is replaced almost entirely in Pennsylvania by the type described by Dr. Rothrock* as "branching symmetrically upward and outward from near the ground, forming a large, round head, while the tips of the branches droop until they almost suggest the Weeping Willow." It is to this type most of the Elms in and near the Susquehanna Valley conform,

* *Forest Leaves*, February, 1894.

and though the finest specimens are found in low ground, as "Old Elm" at Paxtang, with a diameter of almost five feet, others like the Elm at State Street entrance to the Capitol grounds, Harrisburg, live in entirely changed conditions without evidence of deterioration. The State Street Elm has a diameter of three and a half feet, and stands in what was originally swampy land. In 1785 it was already a large tree, and was one of the landmarks in laying out the town. The land has long since been drained, and the tree has endured everything that a street-tree has to suffer, yet, in spite of escaping gas, encroaching pavements, dust, blizzards and electric linemen, is still a beautiful tree and dignifies the entrance-way it adorns.

The great Elm at Dauphin, known locally as the Seven Brothers (see page 215), also belongs to the low-branching class, and with a circumference of twenty-four feet and a spread to branches of almost a hundred feet, is one of the most notable trees in the lower Susquehanna Valley, and if a single tree probably the largest. Its local name refers to the main branches of the tree, and not to the trunk, which, if compound, is formed of not more than four boles. Those who have known the Dauphin Elm longest, however, consider it one tree, and state that they have seen a distinct increase in its size during their lifetime.

The Elm stands on the river-bank, midway between the lock of the Pennsylvania Canal and the river, at this point only a hundred feet apart. The crest of the bank is about thirty feet above low-water mark, and the tree-trunk, which extends from near the crest some distance down the sloping bank, has pronounced differences in form on the upper more protected side, and the lower side, exposed to freshets. The lowest divergence of branches occurs on the side facing the lock, where the branching begins two feet above the ground; on the river-side the lowest divergence is four feet above the base of trunk. Owing to the peculiar features of the ground and encroaching foliage of trees on both sides of the canal, it is impossible to get a good view of this remarkable tree when it bears its great canopy of leaves. Through the summer its crown rises, dome-like, above the surrounding mass of foliage, and may be distinguished from points on the opposite shore of the Susquehanna River, here almost a mile in width.

The picturesque beauty of the Susquehanna at this point, with the bold cliffs of the Narrows below, and the wide bays of the river running inshore above, is too well known to call for any description, but the traveler by rail goes faster and faster through this part of the country, and the real Susquehanna is almost a sealed book, except to raftsmen and canoemen, and will continue to be so unless, with the application of electricity, travel upon the canals following its course becomes once again a possibility.

The Dauphin Elm has been held in grateful remembrance by thousands of men and animals who in the more than sixty years of the canal's existence have enjoyed a brief rest in its shade, as they halted on their weary march from the mountains to tidewater. Besides this army of humble-folk, many well-known travelers passed beneath the Elm in the twenty years when packet travel was the ordinary means of transit through this part of the state, and Dickens in his *American Notes* has given his impressions of the journey.

The immediate surroundings of the Elm suggest a consideration of the present status of trees, especially those of commanding size. They appear to have no rights that any one is bound to respect, and yet there is nothing unreasonable in the idea that a tree of distinction should receive a certain amount of consideration. It is not an exaggeration to state that generally in the rural districts, the difficulty of seeing all of a tree is in direct proportion to its size. A tree of medium size will serve as a prop for spades and hoes and fence-rails, but with increase in size comes a greater opportunity to pile up, until in the case of a Chestnut whose crown and blossoms I saw last summer and supposed it to have a trunk somewhere, the visible connection between the spreading limbs and the ground was formed of several agricultural implements, a broken wagon, some railroad ties and a stable door. The ordinary treatment of trees at present depends entirely on the point of view, and this in matters of greater importance than trees is largely a matter of condition and education. A man has an undoubted legal right to cover his own trees with barn doors, if he feels so disposed, but, with the growth of sentiments such as were expressed at the Forestry meeting recently held in Philadelphia, it is reasonable to hope that the time is passing quickly when a stately, beautiful tree, such as the great Elm, will suggest itself simply as a way station for tools, or as the party wall of a henhouse.

The photographs of the Elm and the Dauphin Chestnut (page 114, No 421, Garden and Forest) were taken by Mr. George Roberts, of Harrisburg, Pennsylvania.

Ann Arbor, Mich. *M. L. Dock.*

The Flora of the California Coast Range.—II.

THE MENDOCINO COAST BARRENS.

THE rivers of western Mendocino County run a short course to the sea, the larger ones rising in a high barrier range, which, running north and south, divides the county. Their course cuts through high mountain chains clothed densely with Redwood forest. The ranges decrease in height as they approach the ocean, and in the last few miles of their course the rivers are tidal canals hemmed in by steep slopes covered with Redwood, Fir, Abies grandis, and western Hemlock. Groves of Alder, which here reaches its best development, are found in the few narrow bottom-lands. The underbrush is varied and luxuriant. Ferns riot everywhere, and the common Brake, Pteris aquilana, attains giant proportions, sometimes forming dense masses eight feet high. From the tidal rivers the steep slopes rise for half a mile and suddenly open on small rolling table-lands, locally called barrens, or, very inappropriately, prairies. These barrens, found between all the larger streams along the coast, are sometimes four miles wide, while at some points they cover only a few acres. They are all of the same altitude and geological formation and appear to be the remains of an extensive table-land, through which the streams have furrowed out their present courses.

These barrens are an interesting field for botanists, and from an æsthetic point of view most picturesque. They are slightly uneven, breaking into swales at the sides and bordered by an irregular line of forests. On the ocean side the land drops by heavily wooded slopes and gullies until the point is reached where the ocean has gnawed it away into rocky bluffs, and the skeletons of the older lands are seen in islets, rocks and reefs far out to sea. Fogs roll inland over the barrens and the air is always fresh and moist. Everywhere are masses of trees and thickets, with occasional open groves of Pinus muricata, the Prickly Pine, the black trunks of the trees rising fifty feet high, with scanty leaves, uneven limbs, and shrinking inland from the prevailing ocean winds, the cones of many years still clinging to them, or, perhaps, all life gone and the skeleton only adorned by the ever-persisting open cones.

In the lower areas, which are so flat that the water stands there in pools in the winter, and where the scanty covering of peaty soil above the impervious clay would seem incapable of supporting life, there are thickets almost impenetrable of the north coast Cypress, Cupressus Goveniana, slender, straight, cone-covered, and mingled with them the north coast Scrub Pine, equally slender and straight. When this dense growth reaches a height of ten feet perhaps a bush fire will sweep through it, leaving a denuded space or skeleton stems, and the fire which consumes the thicket opens the cones and seeds the land abundantly for another tangle. In the hard struggle for existence these little trees fruit when a foot high. Dense tracts of them stretch monotonously away in every direction. The overflow from brackish pools and from dammed springs gathers along the sides in swales with deeper soils and in small

bogs, where Kalmias, Rhododendrons and the Deer Fern, Lomarea Spicant, form dense masses, with a growth of Sphagnum in the more springy parts. In the more generous soil clean, symmetrical, well-developed specimens of two Pines are found, the broad, conical Pinus muricata, its dark long foliage contrasting strongly with P. contorta, with its delicate cones and short light green needles. Lilium maritimum finds a congenial home in these low swales, rooting in the clumps of Deer Ferns or Rhododendrons, and throwing up slender stems from three to five feet high, with dark green leaves in ample whorls and deep red tubular flowers, harmonizing well with the surroundings. Further down these swales are bordered with Redwood and other timber trees until they join the main forest which encloses the barrens.

The higher barrens are covered largely with the tiny-leaved Manzanita, Arctostaphylos nummularia, with scattered Pines and Rhododenrons and a few of the larger fuzzy Manzanitas, A. tomentosa. Ceanothus diversifolius, a low-growing sticky-leaved plant with blue flowers, a beautiful shrub when in bloom, and C. sorediatus, a rigid spiny shrub, not without beauty when covered with its bright bloom, are found here. The small-leaved Manzanita, as I saw it last February, when it was festooned with tiny bells, was a most interesting plant. Little ones only six inches high were in flower, looking like the dwarfer Ericas, and the larger ones were masses of bloom. The plant is five feet high at its best. In the mixed growth on the borders of the swales and in the deep wood grows Rhododendron Californicum, the loveliest of California shrubs. In the higher heaths it is a low, many-stemmed bush with gnarled charred stumps which have survived many fires. In the wood borders it is a tall shrub; in the deep wood it is twelve or fifteen feet high, its glossy evergreen leaves suggesting those of the evergreen Magnolia, and the pink blossoms in this moist air are produced for a long season. Even the rough woodsmen admire it, and it is a most impressive plant, even to an unobserving visitor.

The Huckleberry, Vaccinium ovatum, is everywhere. Here it takes a low compressed form, while in the wood it is tall and slender. It flourishes in the fogs, and late in autumn the bushes are black with juicy berries which only feed the birds. On the borders of the woods and throughout the cleared or burned lands the wild Blackberry, Rubus ursinus, more properly a Dewberry, trails over the ground and drapes every stump, fallen log and bush. It is perfectly at home here and produces in profusion fruit of the largest size. It is sought by parties of campers who leave their homes in the hot interior valleys in July for a few weeks of the cool foggy air of the Coast Range, with incidental berries. The Thimble Berry, Rubus Nutkanus, a shrub attractive in leaf and flower and with palatable fruit, thrives in the cool wood borders. Sallal, that is the fruit of Gaultheria Shallon, is another edible berry which grows on a low ericaceous shrub in dense mats on the woodsides.

In the higher portions a burn will show thousands of tall yellow flowers of Zygadenus paniculatus; the dwarf dark purple-flowered form of Brodiæa laxa is not uncommon, and a little Gentian, with many annuals, is also to be seen. The Cypress, which when crowded is often seen in its dwarf form here, becomes a beautiful and symmetrical tree. In the rich woodland borders its slender and beautiful trunk is forty feet high and scarcely seems to taper. Younger trees of the Western Hemlock are exquisitely lovely; the light green foliage and drooping terminal branches give it a weeping effect that I have never seen elsewhere. Groves of perfect young specimens of Abies grandis are found in the cleared woods.

Ukiah, Calif. *Carl Purdy.*

The Pitch Pine is our most cheerful tree, especially in the early year when it is full of light, in perfect harmony with the yellow earth and the spring sun, and warms the landscape with its ingrained sunniness. Yet men cut down these trees and set imported Larches about their houses.—*Thoreau.*

Plant Notes.

Rubus deliciosus.—This Rocky Mountain Raspberry, or Bramble, as it is often called, is one of the most beautiful as well as the most hardy of shrubs which bloom in May, and yet it is comparatively little known to cultivation, although it was discovered by Dr. James, the surgeon of Long's expedition, as early as 1820. This year the flowers opened the first week in May, and although the flowers of all shrubs forced into bloom by the unseasonable weather have been unusually fugacious, the long arching branches of this Rubus are still well furnished with a succession of the large white blossoms. These are pure white, saucer-shaped, resembling small Cherokee Roses, and nearly two inches across. The plant, when left to itself, has a low, somewhat spreading growth, and old plants assume something of a straggling habit. This is obviated by cutting back the branches after the flowering season, and it becomes a stout, well-shaped shrub, with light brown or gray bark and leaves on long slender red petioles. The fruit, which does not form abundantly here, is by no means delicious, as its name would indicate, but consists of three or four dry and almost tasteless carpels, although some improvement might be made in it by selection. The plant is best raised from seed, as it is rather hard to propagate from cuttings. Its perfect hardiness and the beauty of its flowers make it a most desirable shrub.

Iris lupina.—The Wolf's Ear Iris is found in Mesopotamia and Central Asia, and is one of the introductions of recent years. Like the other Oncocyclus Irises, this is a spring-flowering plant, and coming from a country of rainless summers, it naturally becomes dormant soon after flowering and wakes into life again when the fall rains begin. I. lupina varies materially from I. Susiana, the best known of this section, especially in the form of the flowers, the falls being lance-shaped and the standards being oval, not orbicular, as in I. Susiana and most other Oncocyclus Irises. Like other Irises of this section, it has scanty, narrow and dwarf foliage, and the characteristic coloration of narrow veins on a ground of contrasting color. In this case the veins are purplish brown on a yellow or greenish yellow ground, a combination familiar in some Cypripediums, and altogether quiet, dainty and indescribable. Of course, language always fails to give any adequate description of the colors of flowers, especially when they are unusual shades of primary colors, but it is quite as impossible to describe the infinite varieties of forms which give individuality to every Iris. Altogether, I. lupina is well worth growing for its distinctness and beauty of form and coloring. It has flowered nicely with Mr. Gerard, who, after many experiments, has finally adopted as closely as possible the method of culture worked out by Herr Leichtlin. The rhizomes, which are reliably hardy, should be dried off a few weeks after flowering and kept perfectly dry until late in the year. These Irises are treated in Mr. Gerard's garden as if they were hardy bulbs whose leaves are not frost-proof. After ripening them up they are stored in perfectly dry earth in a cool cellar and planted out at the end of November, at which time the ground is too cool to encourage growth. Planted out in a perfectly open border, without protection, they make no growth until after early frosts are over, and if they were properly grown the previous year their flowering is a matter of course. This season they have required artificial watering, as there has been practically no rain here since March. Every one who has bought Oncocyclus Iris roots, especially of the new kinds and those which have been collected, has been struck by their apparent weakness, and this suggested to Mr. Gerard that it might be well to grow them on so as to secure stronger plants. The result was strong roots, but no increase of flowers, so that with his present experience he is not prepared to say that strong roots and luxuriant foliage are conducive to successful flowering. On points like this, however, it is not well to be dogmatic.

Nicotiana affinis.—This Tobacco plant has probably in most places superseded the old scentless white-flowered

species which was formerly a favorite in many gardens. Nicotiana affinis is a stately plant with pure white flowers with long tubes and spreading lobes, the upper two of which slightly reflex. It is a perennial, but the roots sel-

transplanted in the fall from outdoors and grown in a cool temperature make strong blooming plants in March or April, and are not only as showy and attractive as one could desire in any greenhouse, but they furnish excellent

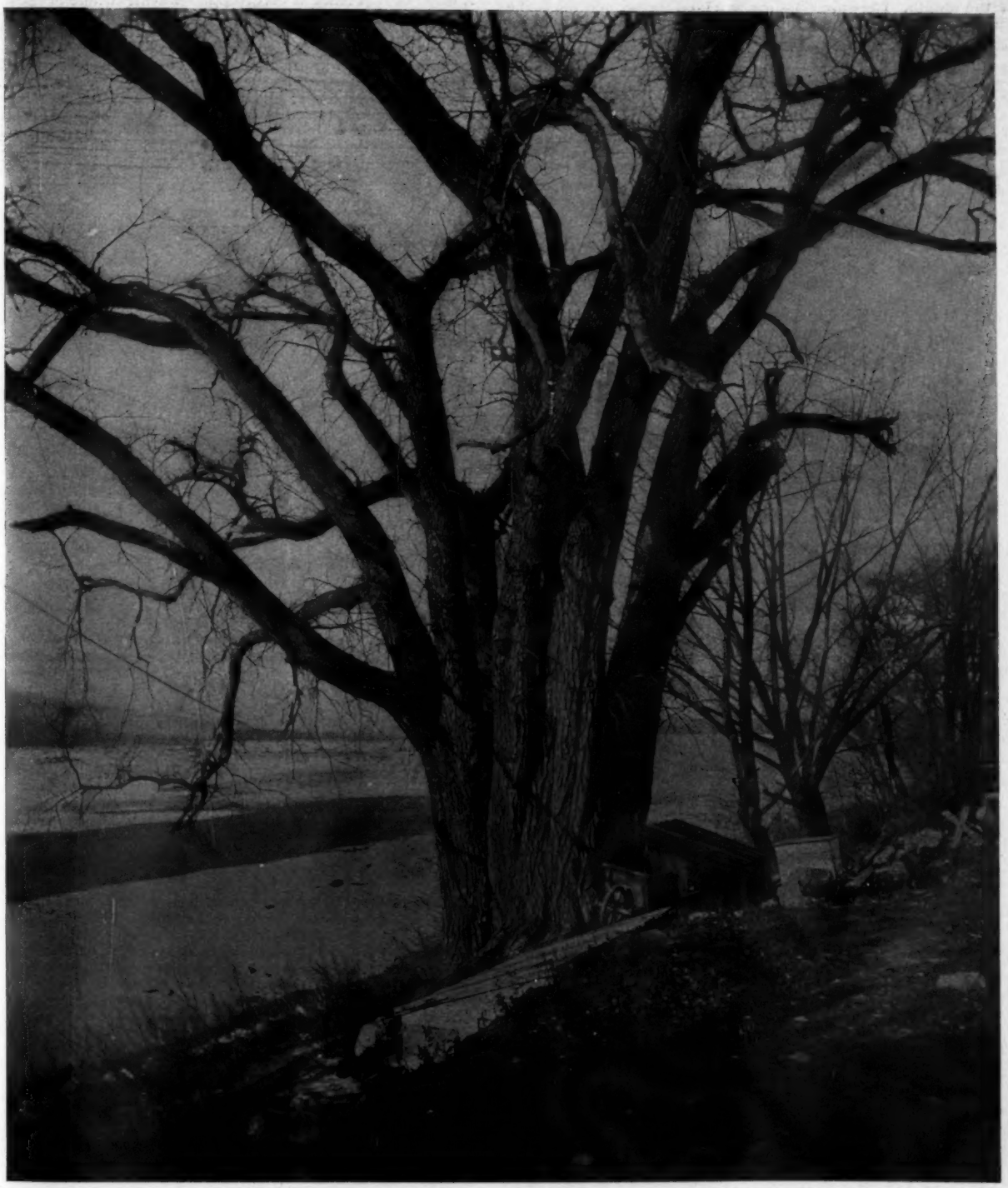

Fig. 32.—White Elm at Dauphin, Pennsylvania.—See page 212.

dom survive the winter here. This is of little importance as it produces seed freely, which germinates plentifully in the border, and the plant is more valuable late in the year than in early summer. It is still more valuable in a cool greenhouse during the early days of spring. Young plants

cutting material, and in vases for house decoration will remain in a good condition for a week. This is owing, perhaps, largely to the fact that they escape the insect fertilization which makes them so short-lived out-of-doors.

Cultural Department.

Carnation Notes.

OUR plants intended to bloom next winter are still in pots and boxes, and will remain there until toward the end of the month. They are standing in a cold frame, and the sashes are not placed over them unless the night is likely to be frosty or rainy. Usually our stock is planted out by the middle of May. Experience has shown us that even a light frost is a severe check to plants. In the fall of the year they will stand a temperature several degrees below freezing without injury, but at this season of the year, after being brought along with fire-heat, they are in a much more tender condition, and a freezing which would have no apparent effect on them in September or October would greatly cripple the plants now. Last year we had much trouble with cut-worms. During the latter part of May they ruined a good many plants, and would have wiped out the entire lot had they not been fought persistently. This season cut-worms appear to be more numerous than ever, and we prefer to keep our young stock in boxes until they are lessened. If any of the readers of Garden and Forest can recommend a radical cure for this pest it would be a decided service to many growers. We have tried about every remedy we have heard of, but none have been successful. Paris green mixed in fresh bran and scattered among the plants poisons some of the cut-worms, but the majority avoid the poison and keep to the Carnation foliage. Lime, tobacco-dust, hellebore, etc., whether dusted on the plants or scattered about the stems, do not in the least check their ravages. Carbolic acid, mixed with water at the rate of one pint of acid to fifty gallons of water, and sprinkled with a rose-can over the plants, did not seem to be any deterrent, nor was Paris green or sulphate of copper, used in a similar way. Hand-picking with a lantern, although a slow method, if persisted in nightly is as efficacious as any remedy I know of. This season we have trapped a large number by scattering succulent leaves of Cauliflower and Cabbage among Phlox, Strawberries and other affected plants. There ought to be some means of wiping out this pest, but growers in this locality seem to be of opinion that cut-worms and rose-bugs cannot be destroyed unless insecticides are used strong enough to injure or kill the plants.

Plants in the benches indoors require plenty of water during such hot weather as we are now having. We recently gave our benches a mulching with well-rotted cow-manure, after having previously tied up the plants and slightly loosened the surface. There is no reason why good blooms cannot be had indoors until planting-time comes around again if the necessary water, stimulants and syringing are supplied. Syringing with good force on mornings and evenings of clear days will benefit the plants and keep red spider in check. Of course, plenty of outdoor blooms may be had by the middle of July from stock specially grown for summer flowering; but those produced under glass are cleaner than those grown outside, although their stems may not be so wiry.

A good deal has recently been written in the horticultural press concerning Fowler's arsenical solution as a cure for Carnation-rust. Mr. E. G. Hill, the well-known Carnation grower, of Richmond, Indiana, who exhibited some of the finest blooms at the New York Carnation Show last February, states that a one-ounce bottle of the solution mixed with eight gallons of water and applied once a week, so as to thoroughly wet all the foliage, cleared up some of his worst cases of rust after three applications given at intervals of a week, that the diseased leaves turned black, after which they were gathered and destroyed. We have tried this arsenic cure on a few affected plants of Rose Queen and Daybreak, but cannot see that it has checked the disease, and the leaves have not become discolored. We experimented with the solution in different strengths and find that by applying it at the rate of one ounce to two gallons of water the rust is apparently killed after two applications. As a further experiment we tried the solution on a few plants at the rate of one ounce to one-half gallon of water and failed to detect any injury to the plants, although possibly repeated syringing with this strength might result in injury. There is no question but the dangers of rust have been exaggerated to some extent, but it is, nevertheless, the worst foe the Carnation grower has to fight. We have tried copper solutions with only a moderate amount of success. I believe a great deal may be done to prevent the spread of rust by cleanliness in the houses and by careful hand-picking of any affected plants when they first show the disease. But when whole houses are attacked it will not pay to use such measures, and from an experience with Fowler's solution I am satisfied that it will destroy the rust if applied somewhat stronger than Mr. Hill recommended. It has not been claimed that it will prevent spread. A longer trial is necessary, on a more extensive scale, to thoroughly settle how far the arsenical solution is a success, but it has proved a benefit in our own case, and we feel certain, if given a fair trial, it will be of advantage to others. A good deal of labor is involved in spraying whole houses of plants so as to thoroughly wet them all, but as most private places grow only a few dozen, or at most a few hundred plants, the work can readily be accomplished.

Of last year's introductions, Alaska is likely to prove the best. It is a persistent bloomer, with a stout wiry stem, flowers of good size and form; and the plant is a vigorous grower. Eldorado, yellow, raised by Mr. Shelmire, is well liked in this locality by those who have grown it. Its flowers have brought as much as a dollar and a half a hundred at wholesale in the Boston market. It flowers more freely than Bouton d'Or, Goldfinch or Buttercup. Meteor, as a crimson, while it gave some fine flowers early in the year, cannot be classed as a prolific bloomer, and compares unfavorably with the older F. Mangold. Rose Queen and Bridesmaid were by no means successes last winter, and we purpose trying them again next year. Rose Queen burst its calyx badly, and Bridesmaid, while of a pleasing shade, did not give more than one or two flowers on each plant. Stock of these varieties was started earlier this year, and possibly by having larger plants next September the returns next winter will be more satisfactory. Nicholson has done indifferently this year, nearly every plant having died out, and this experience is common. With the introducer at Framingham it is at this time doing well, but we do not believe it will be grown much after next season in this locality. William Scott is still proving far superior to all other pink varieties and is growing and flowering better than ever before, with no sign of disease. Lizzie McGowan continues to do splendidly in this neighborhood and is grown in preference to other white sorts. A few growers near Boston still cling to Mrs. Fisher, and as a summer bloomer it is unexcelled, but it compares unfavorably with Lizzie McGowan in winter. For some reason, however, Lizzie McGowan is not well grown by some of the leading Carnation growers in this section. As a rule, their soil is light and sandy; we find it succeeds best in a heavy clayey loam.

Taunton, Mass. *W. N. Craig.*

The Hardy Flower Garden.

THE month of June is the most interesting of any in the hardy flower garden, and the plants not in bloom are fresh and green. The tall Leopard's Bane, Doronicum plantagineum, var. excelsum, is just past its best. It is about two feet tall and quite showy, and, with the Dandelion, one of few composites in bloom so early in the season. The common Marsh Forget-me-not, Myosotis palustris, and particularly the variety semperflorens, does well in the borders, and lasts for years if it is well watered during the summer months. M. alpestris is earlier and more tufted, blooming densely during the early spring months. It is a perennial in its native country, the European Alps, while here it is little better than an annual, and to succeed with it a new stock must be raised every year. Polemonium Richardsoni, a medium-growing Jacob's-ladder, does better in a rather moist shady place than in the full sunlight, as we lately discovered. Some yellow-flowered kinds, which we did not think much of, might have done better had we tried them in shade. Phlox ovatus is the earliest of border Phloxes, and quite showy.

The Globe-flowers, Trollius Europæus and T. Asiaticus, are among the choicest of border plants. They are rather stately, though not tall, with neatly divided and attractive foliage. The flowers are yellow, and, as the name implies, quite globular, being incurved in the same way as a Chinese Chrysanthemum. T. Asiaticus is the dwarfest and earliest, and the flowers are also a slightly deeper shade of yellow. The Day Lilies are among the handsomest of border plants, and they are thoroughly hardy. They are not aggressive, but when established will thrive under adverse conditions. I know an old cottage garden, much shaded and pestered with tree-roots, where these Day Lilies grow thriftily and never fail to bloom well. Hemerocallis graminea is the earliest, followed by H. flava and H. Mittendorffiana. H. Thunbergii is an autumn-blooming kind, and the finest of all. It has been offered many years by a leading firm, but is still scarce.

Lychnis Chalcedonica is never lost. It will grow wherever it has a chance. Its heads of bright scarlet flowers compose well in bouquets. If cut down when going to seed it will start afresh and bloom in the autumn. The Ragged Robin, the double L. Flos-cuculi, has lately been offered, I believe, as a specially new thing. It is an acquisition, new or old. The

charming panicled cymes of pink flowers are very effective when massed in the front line of the border. The true Geraniums, or Cranebills, are all attractive, bright and healthy-looking. Our spotted Geranium maculatum is regarded with favor, and where not native is cultivated. G. sanguinea, a low-growing European species, is in bloom from spring until frost. G. pratense is a beautiful plant, whether we look at its handsomely cut palmate leaves or branched panicles of purplish blue flowers.

Oriental Poppies are, without doubt, the showiest of all border flowers. Their blooms are short-lived, but gorgeous while they last. Among others we have P. pilosum, P. rupifragum, P. nudicaule and P. alpinum, with the annual varieties, P. somniferum, P. Rhœas and the Shirley Poppies.

Pæonia tenuifolia is past, P. paradoxa and P. decora are opening, while the Albiflora and Officinalis groups are one week later. Pæonias and German Iris together in bloom make a beautiful effect, as do blue German Iris and blue Columbines in a bed of Ghent Azaleas all in bloom together. Dicentra spectabilis, the Bleeding-heart, is attractive on the shady side of a shrubbery border. Here it is well placed, as in an exposed sunny place it starts early into growth and is scorched by spring frosts.

Perennial Larkspurs are shooting up fast. There are numerous kinds, mostly of hybrid origin, with Delphinium elatum as seed parent, at least in the original hybrid. D. formosum is among the handsomest. D. Sinensis is a pretty dwarf species, which we have in blue and white varieties. In intensity of blue it is unapproached. Foxgloves make a striking show. They are most effective for the interior of shrubberies, but in full sunlight they die out quickly. Sweet Williams make a distinct display, and usually border the shrubberies. Columbines are abundant, but being biennial in character and coming and going quickly they are not obtrusive. Some garden varieties may run out, but Aquilegia Olympica is as good as ever, and A. Canadensis, we think, has improved. I recently noted purple forms, and to-day I find one with clear yellow flowers, excepting only purple spurs; in every other respect it is of the A. Canadensis type. In addition to German Iris, we have I. tenax and I. oxysepala, neat native species with attractive mauve-colored flowers. I. oxysepala is sweet-scented.

Wellesley, Mass. *T. D. Hatfield.*

Tree Pæonies.—These are among the most uncertain of flowering plants in latitudes exposed to even moderately late frosts. They are perfectly hardy, and even if they sometimes unfold their leaves early these are seldom injured by ordinary spring cold, but there seems to be a critical time in the growth of the plants just after the unfolding leaves expose the flowering buds. At that time these buds seem to be very tender, and a slight frost or even a sudden check some day from a low temperature seems enough to prevent their further growth for the season. The time during which the buds are so sensitive appears to be short, and it will sometimes be found that buds which have been exposed a day or two later than others escape damage. To flower these plants with certainty it is evident that we must take care to furnish temporary protection for a few nights when the buds are in this tender condition. There is some difference in time of moving of the Moutan Pæonies, and the only flowers we have this year are on Gloria Belgarum, and this exception is, perhaps, due to the fact that they unfold later than the others. A well-grown Tree Pæony with fine flowers is one of the most beautiful of garden plants, but one seldom sees in cultivation varieties which are comparable in beauty to the modern herbaceous kinds. A few fine single-flowered kinds have been introduced from Japan in recent years, the best of these being the white-flowered ones, which are sometimes pure in color and sometimes tinged with pink in the centre. With their golden stamens, and often fringed petals and glaucous foliage, they are the perfection of form and coloring. But if I were to grow but one Moutan Pæony it would be Reine Elizabeth, a splendid flower, very double, of a very pure salmon-pink color, deepening toward the centre, and of enormous size. Fortunately, it is not a rare plant, but it requires, like all Pæonies, a generous treatment and a few years of vigorous growth to make a good specimen. Gloria Belgarum is much lighter in color, an enlarged form of the ordinary light pink type.

Elizabeth, N. J. *J. N. G.*

Shrubs and Climbers Winter-killed.—Though the past winter was not extremely cold, its effects upon some shrubs and climbing plants in this locality have been very disastrous. We had less snow than in any winter in the recollection of the oldest inhabitant, and, no doubt, this was one reason for the unusual number of fatalities. One of the oldest of the college buildings has been well clothed for years with Ampelopsis Veitchii, and last summer this was in perfect health; now not more than one-third of the plants are alive. All the plants in a large bed of Diervillas planted three years ago in a moist situation, and uncommonly vigorous last summer, are now killed to within a foot of the ground, while others on higher and drier ground suffered less severely. Some nice bushy plants of Magnolia Soulangeana are killed back almost to the ground. Itea Virginica shared the same fate. A fine specimen of Chionanthus Virginica, standing in a very exposed position, has only barely escaped; it is now just starting into growth, while others in more sheltered locations are in flower. Some old specimens of Rhus Cotinus have suffered severely where exposed. Many of the evergreens are also badly browned. Last summer was an exceptional season for growth. Some of the Magnolias made shoots over four feet in length, and other shrubs in proportion. But the new wood did not ripen and could not withstand the cold. All the shrubs named are considered perfectly hardy here.

Solanum citrullifolium.—This Solanum, one of the annual species, is now flowering in the greenhouses here. It grows to about one foot in height. The leaves are about three inches long by two wide, obovate and pinnatifidly lobed, with stem and midrib covered with short prickles. The flowers are bright blue, with yellow stamens, and about one and a half inches in diameter and borne on short racemes. The corolla is deeply five-cleft. I have not yet tried it in the garden, but it looks as though it might prove a good garden annual. We received the seeds from the Munich Botanic Gardens.

Botanic Garden, Northampton, Mass. *Edward J. Canning.*

Correspondence.

The Elm-leaf Beetle.

To the Editor of GARDEN AND FOREST:

Sir,—I have some old and beautiful Elms about my house, and the Elm beetle is already beginning its work on their leaves. Please let me know the most successful way of fighting these insects, and I should be also pleased to have some suggestions as to the best way to protect trees on the public streets.

Springfield, Mass. *W. F. C.*

[All the most successful methods of combating the Elm-leaf beetle have been published in this paper from time to time, but the safest way to attack the beetle itself is by spraying with some compound of arsenic. A good formula for a spraying mixture is one pound of London purple, six pounds of lime and four quarts of flour in a hundred gallons of water. The lime prevents injury to the foliage by free arsenic, the flour makes the drench somewhat pasty and adherent. Of course, the mixture must be kept stirred, and it must be applied in sufficient quantities and with enough force to touch the surface of all the leaves. On a private place any of the numerous hand-pumps will be found effective, and to reach the top of tall trees an extension pole, such as is used by Dr. E. B. Southwick in the parks of this city, will help to spray any tree that is not more than fifty feet high. The first section of this pole is sixteen feet long and three-quarters of an inch in diameter; the second one is a quarter of an inch in diameter and eighteen feet long; the third is a bamboo bound to the top of the second one, and it is also eighteen feet long. The second pole has two rings or bands at its base, so that it can run up or down, and is hoisted or lowered by a small rope and pulley. The hose is a quarter-inch orifice and made of rubber-cloth insertion, which is strong and light. For larger trees one man can climb up in the branches, and then by using the pole the entire head of the tree can easily be sprayed. Of course, there are various nozzles like the McGowan, the Cyclone, and almost any of them are effective. The spraying should begin as soon as the beetles commence to work, which is when the leaves are rather more than half-grown. It should be repeated every three weeks all summer long, and if the poison is washed off by drenching rain the spraying should be made oftener.

As soon as the larvæ begin to climb down the tree the large limbs and the trunks should be sprayed with the kerosene emulsion. This is made by boiling together six

pounds of soft soap, four quarts of kerosene, two quarts of crude carbolic acid and two gallons of water. This is then diluted in one hundred gallons of water, and it should be sprayed on the trunks and wherever the larvæ are seen, and the ground about the base of the trees, where the insects are found in the form of pupæ, should also be sprayed. This last work should be very thoroughly done, because the insects can be easily attacked and killed in this way, and their destruction at that season will prevent the ravages of the beetles next year.

Of course, in large towns, or wherever there are large estates, several owners can unite together and purchase a steam spraying outfit, by means of which much more rapid work can be done. Several men can be employed at once to manage different lines of hose, and while two or more men are directing the spray into as many trees the same number are climbing adjacent trees, so that the engine and its attendants are occupied all the time. If the nozzle is moved rapidly about, a large tree can be sprayed in three minutes. Some arrangement for climbing large trees without using telegraph-clamps, or creepers, as they are called, ought to be devised, because these sharp metal points penetrate the bark and leave the tree a prey to other insects and fungi. Spraying is not an expensive matter where there is any coöperation, and the machine can be used against other insects, like the tussock moth, which attacks trees of other species. In several places in the country enterprising men have gone into the business of spraying fruit and shade trees—that is, they have one or more complete outfits of machinery, which they send with skilled men to operate them, taking the contract for a certain number of applications during the season at the proper time. No one now attempts to grow orchard fruits on a large scale without facilities for spraying against insects and fungi. It is just as necessary to use these remedies in the case of trees planted for shade or ornament as it is for trees planted for fruit.—Ed.]

Close of the California Orange Season.

To the Editor of Garden and Forest:

Sir,—The orange season is practically at an end in California. There are a few scattering car-loads of Mediterranean Sweets, St. Michaels and Valencias still to go forward, but all of the Navels have been sent east. About 5,600 car-loads have been shipped, and the early estimates varied between 8,000 and 10,000 car-loads.

The prices realized have been the best for the past five years. A large proportion of the Navels were sold at from $2.50 to $2.94 a box, free on board in southern California. The average price for good Navels has been about $2.20, which nets the grower the satisfactory sum of $1.70 a box. Seedlings and other varieties have also sold well, but the crop of these has been smaller than in former years. A result of these conditions has been to create a great demand for Navel nursery stock, both north and south, the demand for these trees exceeding the supply. Two or three years ago there was a general disposition to test the Mediterranean Sweet and other late varieties. But the Navel has been such a favorite in the markets of the east this winter that it now holds undisputed place as the representative California orange.

That Orange groves are still considered a good investment is shown by the proposed plantings this season. There will be a considerable addition to the acreage of southern California, particularly in San Bernardino County, where the crop has been large, not appreciably damaged by frost, and sold at good prices. Investors in the northern part of the state, encouraged by the returns from the early shipments from Palermo and Oroville, will also make some extensive plantings. It is stated that one orchard to be planted near Palermo, if the trees can be obtained, will consist of fourteen hundred acres. Prime trees in the nursery three or four years ago were worth from $1.50 to $2.00 each. Then there was a collapse in prices, owing to overproduction, and an almost total cessation of demand, until trees sold as low as ten cents each. Hundreds of acres of nursery stock were grubbed out and burned. This year there is a demand, not only from California, but from Arizona, Mexico and Florida. Prices have risen to fifty and seventy-five cents a tree, and it is predicted that the Navels will be worth at least a dollar apiece next year. Many nurserymen who have a stock of late varieties are budding them over to Navel buds, although it is a disputed question whether the resulting trees are strong and healthy. As it requires four years to mature a tree for transplanting from the seed there will probably be good prices for all the trees now in the nurseries.

Reports from different parts of southern California indicate that the Orange-trees are setting heavily, that the climatic conditions have been favorable so far, and that, barring hot winds in the summer and frosts next winter, the coming crop will be a large one.

About forty per cent. of this year's crop has been handled by the Southern California Fruit Exchange, and those who have adopted this method of sale are said to be very well satisfied with the returns; the Exchange has received the highest prices in its history.

Some criticism has been made about the statement which appeared in the issue of Garden and Forest for February 5th, as to the degree of cold in Riverside on December 29th and 30th, last winter. It has been argued that it was unfair to place the lowest record of the thermometer at Riverside at seventeen degrees, and in other near-by places but twenty-six degrees. Nevertheless, the mercury did fall to seventeen degrees at one point near Riverside, although this degree of cold was not reached anywhere else. But the injury resulted not so much from an extremely low temperature as from its long continuance below freezing-point. The effect of this was not only seen in ruined fruit, but also in some groves in that locality from which the leaves have fallen and new foliage is appearing. To make the best of the matter, the frost was a very serious calamity and the results show that the original statements were substantially correct. At least 1,500 car-loads of oranges were rendered unsalable by the frost at Riverside, and the 500 car-loads shipped east immediately after the frost was damaged and brought reduced prices, so that little was realized above the cost of picking, packing and forwarding. The total shipments to this time are about 1,900 car-loads, and there are said to be about 100 car-loads now remaining in Riverside. Much of the fruit sent from Riverside since the frost, exclusive of the first 500 car-loads, has been sold at good prices, some of it as high as $2.75 a box free on board. Just what proportion was first-class fruit and what of a lower quality I do not know. Of course, it is unfair to make comparisons, and to state that any section was more seriously damaged than the facts warrant. The loss by frost this year was a loss not to any single locality, but to all of southern California, since it emphasized the disagreeable fact that the Orange groves of this section are liable to a certain degree of damage by frost.

In spite of this fact, Orange groves are held to day at very good prices. The best are not for sale at any reasonable price. Good young orchards from five to six years of age may be bought at from $500 to $600 an acre. Others are held higher. One that I know of, of twenty acres, the crop of which brought this year $2,300, at six years of age, is held at $18,000. It is expected to produce a very much larger crop next year. From $800 to $1,000 an acre is the ruling price for such bearing groves, in the best localities, as are for sale. An acquaintance quoted to me a return of $325 an acre from an orchard of old seedling trees. The largest yield that I have heard of and believe to be authentic is one of $18,000 from forty acres, an average of $450 an acre. These oranges were Navels, and were sold at the highest price. The best five acres in the tract brought a return of $800 an acre. I believe an average profit of $100 an acre a year to be reasonable and not an overestimate.

Redlands, Calif. *Wm. M. Tisdale.*

Notes from West Virginia.

To the Editor of Garden and Forest:

Sir,—We have been fortunate in escaping drought through local rains. Our pasture-fields were seldom greener, but farmers only six or eight miles away complain that the ground is dry as powder, so that the Corn has not begun to germinate. The Yellow Locust, which is more abundantly planted in this neighborhood than any other tree, is past flowering, and the Clammy Locust, Robinia viscosa, and its varieties are in full bloom.

A group of young Laburnums and White Fringe trees is now the most beautiful object in our shrubberies. These trees are most effective when planted together. Both have handsome foliage and drooping flowers which open at the same time. Some bushes of Scotch Broom, planted near them, combine to make a sunny picture of their little shrubbery. The Chionanthus Virginica, or White Fringe, is, perhaps, the most

beautiful small tree we have. When in flower it is adorned as for a bridal morn, with a delicate white veil of bloom which resembles nothing so much as filmy lace. In the damp, cool weather we are now having this exquisite bloom has lasted for ten days, fresh and dainty as at first. The Chionanthus delights in rich soil and should not be crowded in with other shrubs. Given plenty of room it develops into a symmetrical, well-rounded little tree. The Laburnums are here planted ten feet apart, where they receive partial shade from large Tulip-trees, in company with, but not crowded by, the Fringe-trees. The flowers of Phlox divaricata, now passing out of bloom, vary from a striking shade of deep purplish blue through lead-color to white. We bring it from the woods and plant it in the wild garden, among the rocks, under the shade of Oaks, in company with Delphinium tricorne, Columbine, Wild Geranium, early Crowfoot, Stellaries, Rue Anemones and Maiden-hair Fern. The latter we have to water constantly through the summer, and with all our care have little success with Ferns on our dry uplands. They do not grow naturally in our woods, but we find small ones in abundance on the cliffs of the Potomac, where they cling to the face of perpendicular rocks and peep from their crevices in company with Columbines and other delicate wild flowers.

Yellow Lilies—Hemerocallis flava—and German Irises of pure white, lemon-yellow and delicate gray-blue, form a fine group on the lawn against a green background of shrubs. Near-by, and in striking contrast, is a bold mass of double Pæonies in deep crimsons, carmines and flesh colors. These are really gorgeous in coloring and require hardly any care. We never disturb them; they grow so densely that no weeding is necessary, and a heavy mulching of manure in the fall, lightly worked into the soil in the spring, is all the attention they need to make them increase in size every year.

We found the first rose on the tenth of May. It was the very early Cinnamon Rose; Rosa rugosa and the Persian and Austrian Briers followed quickly after; and then came R. multiflora and such old favorites as the Hundred-leaved Rose, the Hermosa, Giant of Battles and the Roses of Provence. The Crimson Rambler is now in bud, and Madame Georges Bruant is just opening a few dew-filled cups. Monsieur E. Y. Teas, Ulrich Brunner and Pierre Guillot are the handsomest deep-red Roses here, and all of them show a few fresh flowers.

Shepherdstown, W. Va. *Danske Dandridge.*

A Natural Garden.

To the Editor of GARDEN AND FOREST:

Sir,—It is easy to find in the neighboring sand region natural gardens which, in variety of plants and in beauty and distribution of colors, equal those arranged by art. One of these was observed early in May. The area comprised about one hundred and twenty by fifteen to twenty feet in width. The fresh, but thin, grass formed an even turf and furnished a lively green foil for the various plants scattered over its surface. It sloped away from a sandy knoll at one end to wet ground and pools of water at the other. Sitting on the knoll one could readily distinguish most of the plants which made up the picture and study their colors and arrangement.

The brightest and most abundant flower was the Painted Cup, represented by both yellow and scarlet varieties and many shades between. The Wood Betony carried spikes of flowers of a pale yellow hue, set among the prettily divided pinnatifid leaves clustered at the base. Bluets peeped out from the midst of blades of grass, and in the wet ground and shallow water were Marsh Marigolds. The Strawberry and large-flowered forms of the Windflower added a dash of white. On the knoll were bunches of Viola pedata with large pale blue flowers, and in the damper ground V. sagittata showed a deep shade of rich violet-purple. There were dainty little cups of the Dwarf Blueberry, white, tinged with rose, though its chief contribution to the scheme of color came from the deep red-brown of the newly expanding buds and leaves. The most stately plant was the Swamp Saxifrage, raising a panicle of greenish flowers on a stout hairy scape, from the midst of large lusty leaves. Here and there in dryish spots were the flat-topped clusters of whitish flowers of Comandra umbellata. The Wild Lupine was approaching flowering, and held above its symmetrical leaves clusters of blue and white buds. Maianthemum Canadense was plentiful, also in bud, and mainly noticeable for its broad smooth leaves of lively green. The grass-like Luzula campestris was in fruit, and the Cotton-Grass was beginning to show the long white down bursting from the rusty scales of the maturing fruit. Ferns were springing up, and the Flowering Fern vied with the Dwarf Blueberry in the color of its fresh foliage. The stout hairy fronds of the Cinnamon Fern were beginning to uncoil, and stood in yellowish or rusty brown bunches. Stems of Equisetum rose beside the Marsh Marigolds or crowded the pools with slender columns. In the grass the beautifully compounded leaves of a Thalictrum were making their appearance. Small shrubs of Salix humilis and S. longifolia were scattered about, displaying cinereous and silky leaves. A diminutive Gray Pine, barely more than a foot high, stood in the grass, its short stiff needles giving to the wild garden a touch of the adjoining woods and Pine-clad sand hills, and though below the Willows in stature, it was still a tree in form and dignity.

Chicago, Ill. *E. J. Hill.*

Recent Publications.

Circular No. 12, issued by the Division of Forestry of the United States Department of Agriculture, is devoted to the physical and mechanical properties of the southern Pines. The data contained in this circular are condensed from 20,000 tests and an equal number of measurements and weighings, and it is published now to make the information speedily available, while fuller details will be given in a special bulletin. The importance of trustworthy information regarding the Pines of the south is evident from the fact that they furnish most of the hard pine material used for constructing purposes in the country, while the annual cut is certain to increase rapidly as the soft pine supplies of the north decrease. The Pines under consideration are first the Long-leaved Pine (Pinus palustris), the Cuban Pine (P. heterophylla), the Short-leaved Pine (P. echinata) and the Loblolly Pine (P. Tæda). The names of these timbers in the market are often used interchangeably, and the materials are mixed in the yard, and trustworthy microscopic distinctions of the wood of the four species have not yet been found. There is a very interesting paragraph in which the diagnostic features of the different woods are given to assist the identification of the species. This is followed by a table giving the bending strength and compression strength of the wood of each species, together with the relation of the strength to the weight. An interesting study of the distribution of the weight and strength throughout the tree furnishes a basis for a diagram which distinctly sets forth these variations in the different species in a graphic way. There are brief chapters on the influence of locality and of moisture, on the behavior of different woods in shrinking, the effects of kiln-drying and the influence of immersion in water on the strength of the different woods. The tests have proved conclusively that timber which has been boxed or bled for turpentine is quite as strong as that which has not been so treated if it is of the same weight, that the weight and shrinkage of the wood is not affected by bleeding and that the bled trees contain practically the same amount of resin as unbled trees, the loss of resin referring only to the sap-wood. The results of tests of strength with large beams and columns are most interesting. When we consider the care with which these experiments have been made, the large number of trees and test pieces which have been used and the uniformity of the methods employed, it will be seen that this work is of serious value, and, perhaps, it is the best original work that has yet been accomplished by the Forestry Division. It ought to be added that this circular is written with a conciseness and a clearness which deserves the highest commendation.

Notes.

No. 7 of the third volume of the *Contributions to the United States National Herbarium* is devoted to a continuation of Professor Coulter's study of Cactaceæ, containing a preliminary revision of the North American species of Echinocactus, Cereus and Opuntia.

Professor N. L. Britton, of Columbia College, has been appointed Director of the new botanical garden to be established in Bronx Park, in this city. Professor Britton has been Secretary of the Board of Managers ever since the project took form,

and it is due to his untiring labors more than to any other cause that the scheme has been organized under such promising auspices.

There were abundant rainfalls in central and northern California last week, and these were followed by frosts which did serious injury to the young shoots of the vines in Napa and Sonoma valleys. So far this year has been an exceptionally trying one for the orchards and vineyards of California.

The auction sales of plants in this city have been unusually large this spring, and common garden plants of good quality have brought so far remunerative prices. The demand is so great that special sales have been held almost every week, when the prices realized were as good on the average as those on the regular days.

Last week brief mention was made of the intrepid explorer and botanist, Father Delavay, so widely known for his botanical researches in China. It is worth adding here, as indicating the scope and magnitude of his labors, that, according to the *Bulletin of the Botanical Society of France*, Father Delavay discovered in the difficult mountain regions of Yun-nan more than fifty new species of Rhododendron, as many species of Pedicularis, forty new Gentians and as many Primulas. He sent to the Herbarium of the Jardin des Plantes about four thousand species, of which one-half were new.

A bulletin just issued by the New York Experiment Station treats of the Carnation rust, which is considered, after all, one of the most serious enemies of that plant, although it is not so much dreaded as it once was. The pamphlet contains what is known at present of this disease, and will prove interesting to all students of fungi as well as all those who grow these plants to any extent. The following treatment is recommended: Grow varieties the least subject to rust. The variety William Scott, for example, is nearly rust-proof. Cuttings should never be made from diseased stock, and it should be borne in mind that plants may be diseased and not show it. If there is any danger of the presence of the disease the cuttings should be dipped in a solution of potassium sulphide of the strength of one ounce to a gallon of water, so as to kill any spores which may cling to them. Fresh sand should be used in the propagating-bench. From the time they are struck until the plants are exhausted by flowering they should be sprayed every week with potassium sulphide or copper sulphate. Before the plants are brought in in autumn the houses should be fumigated thoroughly with sulphur. There is no known method of wholly preventing infection in the field, but plants grown all summer under glass can be more easily managed.

An unusually successful meeting of the New Jersey Forestry Association was held in Plainfield on Thursday last. In the afternoon, after a business meeting, there was a lecture by Professor B. D. Halsted on Diseases of Trees, which called forth an animated discussion as to the practical methods of keeping trees in health. In the evening Mr. Fernow, Chief of the Division of Forestry, delivered a lecture from which we hope to make extracts in some future number. There was a very instructive exhibition of photographs, maps and other illustrative matter, and the arrangements for exciting the interest of school children were made a feature of the meeting. On Friday the officers of the Forestry Association and a number of the members, together with the Palisades Commissioners, were taken up the river in one of the boats of the Pennsylvania Railroad Company to see how the cliffs had been mutilated by quarrying. Messrs. J. J. R. Croes and W. D. Morse, of the Palisades Commission, explained the proposed measures for protecting this territory as a national park and forest reserve. John Gifford, the State Forester of New Jersey, who has lately traversed this district on foot, explained the character of its forests and the advantages to be derived from having a school of forestry so near to a city like New York.

California cherries, large and showy, are now coming in large lots, the first car-loads being due here this week. Among varieties now here are Rockport Bigarreau, handsome and large, pale amber, marked with red, of good quality, and highly esteemed for canning and for shipping. Governor Wood is another good light-colored cherry now in season, and the first Royal Annes arrived last Monday; these were small, however, and fair specimens will hardly be seen within ten days or a fortnight. Black Tartarians are, perhaps, more plentiful than any other variety. A fair price at retail is forty cents a pound. The first apricots of this season arrived on Saturday, and while some are of fair size and coloring, even the best are immature, and find slow buyers in the wholesale markets. Strawberries have been in scant supply and of inferior quality for the lack of rain, but are now beginning to come in better form. The best from Maryland commanded on Monday twenty-five cents a quart. Florida peaches cost $1.00 a dozen. Gooseberries may be had for twenty cents a quart, and huckleberries for the same price. Almeria grapes are still shown in the best retail fruit-stores and bring seventy-five cents a dozen. White Muscats and Black Hamburgs, from Newport graperies, sell for $2.50 to $3.00 a pound. Rodi oranges, from the Mediterranean, and California Navels both command high prices, and since the stock is not heavy, and strawberries have been in rather scant supply, there is sufficient demand to sell this fruit at $4.50 to $5.00 a box, wholesale. The Navel oranges now on the market are mostly from cold storage, but some seedling oranges are still coming from the Pacific coast. Lemons have been cheap, and nearly 220,000 boxes are now on the way to American ports. Pineapples are coming from Cuba and the Bahamas; 16,286 barrels were received from Havana during last week, and two schooner-loads are due this week from the latter islands.

Messrs. James Lindsay & Son, fruit salesmen, of Edinburgh, Scotland, have written us some interesting notes about American apples, some of which we present to our readers to supplement the statement of Messrs. J. C. Houghton & Co., of Liverpool, England, which was given last week. In the Edinburgh market, as in other markets of Great Britain, the best grades of well-colored apples are in the highest demand, such as Baldwins, Northern Spies, the genuine Spitzenbergs, York Imperials and Romanites, from Virginia, which last are quite different from the fruit of the same name from other parts of the United States, the latter being a pale, undecided color, instead of dark rich-looking like the Virginia fruit. Baldwins are inclined to ripen quickly, but their quality is liked and they always command a ready sale, bringing from $4.50 to $5.50 a barrel. The Northern Spies are favorites, especially those from Canada, which seem to be superior in keeping quality to those grown farther south. Many apples are exported as Spitzenbergs which do not have the shape of the genuine fruit and which are quite inferior in flavor and have none of that dissolving quality which distinguishes the true fruit. The King apples, especially those from Canada, take the first rank on account of their color, their flavor, their fine fibre and the rich look of their flesh, and they always bring good prices. Of course, the Newtown Pippin is the favorite among green apples, and those grown in Virginia of the finest flavor and most melting quality, in ordinary seasons range from $5.00 to $7.50 a barrel, but owing to their abundance this year prices ruled lower. It should be noted that there are two kinds of Newtown Pippin which reach Great Britain, one of which is gritty, hard and inclined to be dry, resembling somewhat the Swaar. They are more beautiful, however, than the Virginia Newtowns, which do not look as bright, being of a greenish yellow with a small red spot. The Rhode Island Greening is always in demand for cooking purposes, and Greenings grown in Canada have superior keeping qualities. The prices rule from $3.50 to $3.75 with a fair ordinary supply, but when the importations are excessive they have fallen as low as $2.75 a barrel. There is little demand for Russets, except when other apples are scarce. During the season of abundance they are neglected and sell at low figures. The York Imperial is a comparatively new apple, but as it has arrived this season it commands good prices on account of its size and bold appearance. It has brought from $4.00 to $4.50 generally, but when other kinds are scarce it has sold for as much as $5.50. Rome Beauties have not been known much until recently, but being of good keeping quality and bright color they command ready sales, although they are rather dry in quality. Ben Davis has little to commend it except fair keeping qualities, and there is no active demand for it when there is anything like a fair supply of other kinds. Winesaps from Virginia are much sought for here. They have a rich deep color and superior flavor, excellent keeping quality, and they carry well, so that they have everything to recommend them. They generally sell at from $4.50 to $6.00 per barrel. The so-called Winesaps from other parts of the United States are often poor and soft. This may be due to lack of care in thinning and sorting, but, as it appears in the English markets, the even-sized, beautiful fruit from Virginia is quite as distinct as if it was a different variety, as perhaps it is. In richness of flesh the true Winesap can hardly be surpassed. The Fameuse is also a great favorite on account of its flavor and the absence of any grit in the flesh, while the smooth texture of its skin is near perfection.